

## **SECOND SUBSTITUTE SPECIFICATION - 10/229,164**

### **CROSS-REFERENCE TO RELATED APPLICATIONS**

The subject U.S. patent application is a division of U.S. application No. 09/581,163, filed June 13, 2000 and now abandoned. U.S. application 09/581,163 was the U.S. National Phase of PCT/DE98/03697, filed December 16, 1998, published as WO 99/30910 on June 24, 1999 and claiming priority to DE 197 55 691.4 filed December 16, 1997.

Method for Producing a Printed Product

### **FIELD OF THE INVENTION**

**[001]** The present invention is directed to a method for producing a printed product. The printed product includes material webs and partial width material webs.

### **DESCRIPTION OF THE PRIOR ART**

**[002]** USP 4,901,993 A describes a method for producing a printed product which is easy to open. Here, material webs of different widths are conducted on top of each other and are subsequently transversely folded, so that a double page lying on the inside projects past a first page of the printed product.

**[003]** GB 2 299 970 A discloses a folded printed product, whose double pages have a format of the same size, but are folded asymmetrically.

## SUMMARY OF THE INVENTION

**[004]** The object of the present invention is directed to a method for producing a printed product.

**[005]** The invention has the following advantages in particular:

**[006]** A continuously changeable total surface can be produced by the use of a newspaper rotary printing press without changing the exterior formats of the product, for example a tabloid product of the sizes 420 x 289 mm.

**[007]** Newspaper rotary printing presses known so far have the disadvantage that they can only produce fixed page skips, or jumps and therefore can produce newspapers having total surfaces which can only be changed in steps. If, for example, a single width newspaper rotation with double cylinder circumference - a so-called eight page rotation -, is assumed, it is possible by the use of this to produce page skips of two pages for broadsheets, four pages for tabloids, or eight pages for magazines of half the tabloid format in double production.

**[008]** In a more economical type of production, "collection production", the producible printed surfaces, or respectively page skips, known in the past, are even more disadvantageous. It is only possible to produce skips or jumps of four pages for broadsheets, eight pages for tabloids or only sixteen pages for magazines.

**[009]** The result of this is that the print shops are always forced, also editorially, to process the information for their newspaper and newspaper-like products in such a way that the page skips which can be produced are filled on the entire page. This necessity becomes more difficult, the larger the percentile change of the entire surface caused by the page skips becomes. For example, with a rotation of double the circumference, the change for a 16-page tabloid product is 25% in double production and in collection production even 50%. These large page skips can often not be sensibly produced editorially, even with the most modern software systems - such as an automatic letter size adaptation, for example, which "compresses" a defined amount of information into a defined number of pages. In these cases, it is very often necessary to do completely without an investment in the more economical rotations with double cylinder circumferences, or that these must be at least operated in double production.

**[010]** A further economical disadvantage of these whole page printed surface skips are the paper costs which, in connection with a newspaper or newspaper-like product, makes a significant difference at approximately 30%.

**[011]** If, for example, the editing staff perceives the possibility, or even the necessity, to include an additional whole-page advertisement in the product, it is necessary to create additional "filler pages" for producing this whole page advertisement. This means that higher paper costs than would actually be necessary must be accepted. The situation is even more serious in the situation of free newspapers, which specialize primarily in small private ads and which scarcely have editorial "filler pages".

**[012]** The present invention consists in that, for example in a double-width rotation for the production of newspapers or newspaper-like products, it is possible to use, besides a paper web of full, half and quarter width, simultaneously also a web having any arbitrary variable width. Because of this, it is possible to variably change the total surface of the product continuously, without the original dimensions of the product being changed, such as, for example, in case of a general web width change of all webs.

**[013]** In this connection, it has been shown to be technically advantageous to operate with variable web widths between one half and a full web width in case of single-width rotations, and in case of double-width rotations, with variable web widths between a quarter and half a web width. The reason for this is that very narrow web widths, narrower than a broadsheet page, are very difficult to handle by machine technology, and that too large a number of different web widths is uneconomical to procure. For example, in a double-width rotation it is possible to achieve the same effect with a  $3/8$ -width and a normally present  $1/2$ -width web as with a  $7/8$ -width web, as seen in Figs. 1 and 2 .

**[014]** The additional web strip of arbitrary width can be employed for all products which can be produced in the newspaper rotation, such as broadsheet products, tabloid products, magazine products, etc., for example, and can be processed with web guide elements customary in newspaper rotation, such as turning bars, mixing arrangements, funnel groups, etc., and with their help can be placed at almost any location in the product. It is moreover possible to attach these width-variable web strips, which are processed into lateral strips of partial width, to the whole product by the use of all known attachment aid devices, for example stapling or gluing devices, etc.

In the same way, it is possible to use and to process several webs of variable web width simultaneously.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[015]** Preferred embodiments of the present invention are represented in the drawings and will be described in greater detail in what follows.

Shown are in:

Fig. 1, a schematic representation of a material web of a width of four broadsheet pages,

Fig. 2, a schematic representation of a material web of variable width,

Fig. 3, a schematic representation of a material web in broadsheet format,

Fig. 4, a schematic representation of a material web in tabloid format,

Figs. 5 to 16, schematic representations of printed products.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[016]** Some printed products in accordance with the present invention, and in a broadsheet format are represented by way of example in Fig. 5 to Fig. 12.

**[017]** A first material web 1 can be a "single width" material web 1, or a partial material web 1 of a multiple-width, for example a double-width, longitudinally cut

material web 1. In what follows, the designation material web 1, as seen in Fig. 1, is used for a first material web 1, also for simplification in case it is a cut partial material web.

**[018]** To produce a printed product of a first preferred embodiment as seen in Fig. 5, a first material web 1 of a first width  $b_1$ , for example  $b_1 = 2b$ , and a first partial material web 2 of a width  $b_2$ , are brought together.

**[019]** For example, the width  $b_2$  of the partial material web 2 equals the width  $b$  and thus corresponds to half the width  $b_1$  of the first material web 1. The material web 1 and the partial material web 2 are conducted on top of each other in such a way that their outer edges extend parallel and symmetrically in respect to each other, all as seen in Fig. 5.

**[020]** For example, the material web 1 and the partial material web 2 are longitudinally folded by the use of a funnel, not represented, and are subsequently laterally cut at a length  $l$ , which length  $l$  is equal to a section length. Thus, the printed product has a first page 3, located on the outside and, of a format width  $b$  times length  $l$ .

**[021]** A double page formed by the partial material web 2, whose individual pages have half the width of the first page 3, is located inside a first double page constituted by the material web 1.

**[022]** In further preferred embodiments depicted in Figs. 6, 7, 8, 10, a second partial material web 4 of a width  $b_4$ , for example  $b_4 = 0.5 b$ , is brought to the first material web 1. This partial material web 4 can be brought in, for example, congruently with an outer edge of the first material web 1, as seen in Figs. 8, 10, or with a provided fold line of the material web 1 as seen in Figs. 6, 7, and can be fastened, for example by the use of an adhesive strip 6, on the first material web 1, as seen in Figs. 8, 10, or can be loosely inserted, as seen in Figs. 6, 7.

**[023]** This second partial material web 4 can be brought in additionally as seen in Fig. 7 to the material web 1 and to the first partial material web 2 of the first preferred embodiment depicted in Fig. 5 .

**[024]** Fig. 9 shows a preferred embodiment in which two partial material webs 7, 8 respectively have widths  $b_7, b_8$ , for example  $b_7, b_8 = 1.5 b$ . The two partial material webs 7, 8 are offset with respect to each other by  $b/2$  in the direction of the web width, so that a longitudinal fold folds the partial material webs 7, 8 asymmetrically.



**[025]** In Fig. 11, a partial material web 9 of a width  $b_9$ , for example  $b_9 = b$ , has been inserted into the partial material web 7, so that a left outer edge of the partial material web 9 lies congruently on the fold line of the partial material web 7 and rests on the shorter leg of the partial material web 7.

**[026]** Fig. 12 shows a printed product in which two partial material webs 11, 12, respectively of a width  $b_{11}$ ,  $b_{12} = 1.5 b$ , have been placed on the first material web 1 of a width  $2b$ , so that a left outer edge of the partial material web 11 is approximately congruent with the left outer edge of the material web 1, and a right outer edge of the partial material web 12 is approximately congruent with the right outer edge of the material web 1.

**[027]** Printed products in tabloid format are represented, by way of example, in Figs. 13 to 16.

**[028]** To make the printed products in Figs. 13, 14, 15, a material web 16 of a width  $b_{16}$ , for example  $b_{16} = b$ , and a partial material web 17 of a width  $b_{17}$ , for example  $b_{17} = 0.5 b$ , are brought on top of each other. Subsequently, the material web 16 and the partial material web 17, placed on top of each other, are transversely cut into signatures, and are transversely folded, for example by the use of a folding jaw

cylinder. As represented in Fig. 16, it is also possible to insert several partial material webs 18, 19 of a width  $b_{18}$ ,  $b_{19}$ , for example  $b_{18}$ ,  $b_{19} = 0.25 b$ , next to each other and/or on top of each other, into the material web 16.

**[029]** It is common to all of the preferred embodiments, that a maximum format is set by the first, outside located page or title page of a double width page of a signature, and that at least one page of a smaller format than the first page lies inside this folded signature.

**[030]** Since all printed products are made of brought-together or assembled material webs, at least one outer edge of the narrow material web lies neither on an outside edge nor on a fold line of the wide material web.

**[031]** Measurement and ratio information, as well as the terms "equal to" and "congruent" should be understood in the technical sense, so that tolerances are permissible. These tolerance can appear in the millimeter range, in particular with folded products.

**[032]** It is possible, with the present printed products, to selectively surround a block of information which is connected by its contents, for example an advertisement, a group of advertisements, a group of advertisements in the form of a column, or entire,

or respectively parts of columns, with longitudinal perforations and with transverse perforations, and to cut them out of the printed product in this way.

**[033]** The multifunctional perforation can be achieved by the use of machine technology in the following manner:

**[034]** Assume that the newspaper product is configured in the form of a broadsheet product in columns, as seen in Fig. 1 and all pages are produced with the same column width. The longitudinal perforation device can be arranged at a location at which several, or even all, of the webs or strands of webs are combined. Because of this, one longitudinal perforation device with several perforation cutters, which can be of variable width transversely to the paper web, is sufficient.

**[035]** If, however, individual pages are to be differently longitudinally perforated, these pages, or respectively the associated paper web, must be equipped with a separate longitudinal perforation device.

**[036]** The transverse displacement of the individual longitudinal perforation cutters can be performed manually or automated, and in the extreme case can be performed by remote control.

**[037]** In the simplest case, the transverse perforation can be uniform for all pages of the product. In this case, only one transverse perforation device is required. If all pages only have a single transverse perforation, one transverse perforation cutter is sufficient.

**[038]** If several transverse perforations are required, the transverse perforation device must be equipped with several transverse perforation cutters. Ideally, the transverse perforation cutters are arranged in such a way that they can be varied in number, as well as in the circumferential position, and therefore also in the distances between the perforation lines.

**[039]** In the extreme case, each page has several transverse perforation lines which are different from page to page, and which can extend over the entire page width or over a partial width of the page, for example a longitudinally perforated column. In this case, it is necessary that each paper web be equipped with a transverse perforation device, which contains respectively one transverse perforation cutter per the required number of transverse perforations over the width of the paper web, and per required number of transverse perforations, over a length of the paper web corresponding to a cylinder circumference or half a cylinder circumference.

**[040]** The cutter holder must be configured such that the respective cutter position can be varied in the transverse and in the circumferential directions, that different perforation cutters of different widths can be used, and that the number of cutters and their circumferential positions, with respect to each other, can be varied.

**[041]** In this case, the use of an electronically controlled independent drive mechanism for this perforation device makes the synchronization of perforation and rotation and of an exactly register-maintaining perforation easier.

**[042]** If the product is made as a tabloid, the "column perforation" is created by the use of the transverse perforation device. The perforation which is horizontal in the reading direction in the end product, however, is produced by the use of a longitudinal perforation device. If the product is not only to be perforated continuously horizontally, but also perforated partially, for example in columns, the perforating circumference of the longitudinal perforation cutter is divided in accordance with the column width, similar to a skip-slitter cutter.

**[043]** In order to be able to react as flexibly as possible to different column widths and to columns, which are to be perforated, or respectively not perforated, within the same perforation track, it is necessary that the longitudinal perforation cutter holder

can be universally employed. To this end, it is necessary that it can be displaced transversely to the web running direction as desired, and can receive different perforation cutters of different circumferential design or, even better, different individual cutter circumference segments at any arbitrary location. Because of this, it is possible to create perforation lines of any desired width, which can be interrupted at any desired intervals, at any desired location of the page.

**[044]** While preferred embodiments of a method for producing a printed product in accordance with the present invention have been set forth fully and completely hereinabove, it will be apparent to one of skill in the art that various changes in, for example the specific type of printing devices used, the particular folders used and the like may be made without departing from the true spirit and scope of the present invention, which is accordingly to be limited only by the following claims.

WHAT IS CLAIMED IS: